



Imprimatur,

T. MEWS.

OXON.

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Vice-Cancel.





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A
SHORT and SURE
GUID

in the Practice
Of Raifing and Ordering

O F
Fruit-Trees.

Being the many years Recreation
and Experience of

FRANCIS DROPE,
Bachelour in Divinity, late fellow
of *Magdalen Colledge in Oxford.*

OXFORD,
Printed for *Ric. Davis*, An.Dom. 1672.

TO THE
RIGHT HONOURABLE
AND TRULY NOBLE

PHILIP,
LORD WENMAN,

Baron of Kilmainham,

Viscount Tuam.

My Lord,

♦♦♦♦♦♦♦♦♦♦ S a testimony of my
♦♦♦♦♦♦♦♦♦♦ Gratitude, for those
♦♦♦♦♦♦♦♦♦♦ A ♦♦♦♦♦ many Favours I have
♦♦♦♦♦♦♦♦♦♦ received from your
♦♦♦♦♦♦♦♦♦♦ Lordship, I humbly present this
small Book of my deceased Brothers,
of Planting. I confesse it unworthy

The Epistle Didicatory.

worthy your Honours perusal, who are as great a Judge of Books as Men: yet I intreat your Lordships Patronage and Countenance, presuming it may be serviceable for the preserving, and perfecting your new Orchard at *Brackly*, and so somewhat prevail towards the procuring your Honours pardon, for prefixing so great a Name before so mean a Discourse. My Lord, I lay it at your Feet, and assure your Lordship, it comes from one who honours you in the most secret corners of his Heart, and who had no other way, nor method to express it but this. I know your Lordships Charity to be so diffusive, as to invite

The Epistle Dedicatory,

vite all those, who have the honour
to know you, to make their applica-
tion to it : and that you are readier
to afford your protection to those
that want it, then they are to crave
it, and will not I humbly conceive,
be offended at this Dedication,
knowing the weakest, and meanest
ever seek their support from the
Great, and Good. And that is ano-
ther Reason of the present Ambi-
tion of (My Lord)

Your Honours

most obliged,

most humble and


most devoted servant,

Edward Drope.



THE P R E F A C E.

Friendly Reader,

 He Author of these
following papers, ha-
T ving lately pay'd his
debt to Nature, I
thought it great pitty
that they should die, and be buryed
with him, since I am inform'd, by
some of Learning and judgment, they
may be useful to the publick, and
this is the only aim (and not any
popular applause) that produceth this
publica;

The Preface.

publication; for though many worthy and ingenious persons have written more largely already on this Subject, yet none (I presume) hath say'd so much, in so little a Treatise, and what he directs, is by his own Experience, which I take to be the best Instructor. Yet it was not his study (who was by profession a Divine) but his Recreation, an inoffensive delight hee took in Planting; neither do I think this study so ill becoming that Function, when Solomon, that great King, and princely Divine, wrote of Trees, and Plants, from the Cedar in Lebanon, to the Hysop that springeth out of the wall; that is, from the highest and tallest Tree,

The Preface.

to the smallest Shrub, and lowest herb. I may truly say, this our Author knew most Herbs and Flowers in this Nation, yet I do not find he wrote any thing of them; but I would not have thee think that this Knowledge was his Master-piece, who had a Competency in all Arts and Sciences, sufficient to compleat a Scholar. He was my Brother, and I am affraid lest that my affection should lead me to partiality, and therefore shall say no more as to that particular; only something more as to the Book, which is but small, yet may prove of great benefit to thee; and therefore if thou art a good Husband, thou canst not but think it well worth thy money, when

The Preface.

when it teaches thee how to Plant
and order Fruit-trees, the planting
whereof, both for Sider and Ta-
ble Fruit, I account one of the best
parts of good Husbandry, for I have
frequently seen (in diverse Coun-
tries of England) what improve-
ments persons have made upon their
Estates by so doing, beside that Li-
quor of Cider is say'd to agree best
with our English Bodies, men Liv-
ing to great Ages in the Cider-Coun-
tryes, both Active and strong, as may
appear by a storie; I shall here insert,
which I borrowed out of an Honoura-
ble and Learned Author; * that
* Lord Verulam. at a Wake in Herefordshire, a
Dance was performed by eight men,
whose

The Preface.

whose Ages, added together, amounted to eight hundred years, some being as much above one hundred years Old, as others were under that Age. We may well suppose them to be Cider-Drinkers most of their dayes; and what an excellent Remedy it is for the cure of the Stone, will be verifysed in this following Example; a Gentleman of Quality, of my acquaintance, who from his Childhood was tormented with the distemper of the Stone, being upon some occasion in that Countrey for one year and half, or thereabouts, fell to drinking of Cider, and thereby cured himself, as is supposed, for he has not been troubled with it since,

The Preface,

since, and it is now four or five years
agoe. I will detain you no longer
at the Door, but let you into the Or-
chard, and so farewell.

I am

Thine in all Christian Offices
of Love and Service,

Comner,
March. 1672.

Edward Drope.

(1)

A

SHORT and SURE
GUID

IN

*The Practice of 'Raising and Order-
ing of Fruit-Trees.*

THe goodnesse of materials, and the sufficiency of the Ground-work, as in Building, so in Planting, is the first thing considerable; The stock therefore being the cheif foundation of a good Fruit-tree, shall give the Beginning to this my ensuing discourse. And whereas the best of stocks are produced from the seed; I will not pervert Natures method, but keeping in her Tract all the way treat of such in this first following Chapter.

B

CHAP.

CHAP. I.

*Of Raising Stocks from the
seed.*

EVERY sort of seed hath a delight peculiar to it self, to be produced in a place, that affords juice most agreeable to it's Nature. The best Ground (or mould) that I have seen for the sowing of Apple and Pear-kernells is a Clay. If you have not the conveniency of such for your purpose, then procure and bring into the Nursery (or Garden) good store of Clay, and make therewith a Bed of about one foot and an half in Thickness, of what breadth and length you please. Upon this Bed must be laid some spit-dung

(3)

spit-dung (*i. e.* such horse-dung as is rotted in the heap, and may be digged with a spade) or excellent mould, upon which likewise lay as much sand, as will cover half a foot, or more, thick, when you have thus done, digge the sand, dung (or mould) and half of the Clay, so that they mix well together. Let this be done in the Summer before you intend to sow your kernells, so will this Compost be sufficiently work't together against the time you sow, which may be any time after *Christmas* and afore *Mid-March*.

Digge it over often, but especially digge it afresh, and very fine, when you intend to put the seeds in the ground ; rake it then even, and pick all the stones, and trash

B 2

out

out of it. Afterwards, by the guidance of a line, digge (or drill) a little trench of about two inches deep, and as much broad; into the which cast some of the seed. When you have done this, remove the line, and place it about half a foot distant from the trench, make by it another trench in like manner, and sow it with seeds, as you did the former. Do thus, until all your bed is sown, or your seeds spent. Then cover all these little trenches by raking the earth upon them. Let this bed for kernells be on the North-side of a wall, or fence, or in some shady place: So will the young plants be freed from the parching heat in the Summer; and thereby be kept moist a longer time then they would in another place. This

This bed, being thus made of clay, yeildeth little harbor for the mole, mouse, or worm; all which are very busy in destroying seeds sown in light ground; what the clay is supposed to kill by its cold and astringent clamminesse, the sand preserveth by heat and friability; filling up the chaps, which would otherwise be in the clay, if the bed should happen to be neglected to be watered in season. You may not wonder that I make choise of clay to sow kernells in; for it is the ratural soile for them: witness the moist and clay woods, which afford far better (and greater store of) wild stocks, then any other whatsoever.

By this manner of sowing in clay, I have known kernells to

B 3

shoot,

shoot, some two foot, others a yard in a dry year ; when those, that were sowne in loose and richer mould , grew not above haif a foot, or a foot at the most.

Having mentioned something about Mice, I thinke it not amisse to adde thereunto in this place (once for all) how to keep them from destroying the seeds, which (besides the trappes) may be done by mixing a little soot with them in the sowing, and to scatter a little lime and soot on the superficies of the bed, after the seeds are sown : by the bitternesse of the soot and the heat of the lime, the Mice (unlesse very much pinch't with hunger) will be cautelous to venter thereon, as disagreeing to the relish of their discerning pallats.

But

But to return where I left.

Although this is the best kind of ground (or mould) to sow the seeds in; yet will I not deny, what I have seen, viz. that they have thrived very much in others beside.

Plum-stones will grow very well this way: but Cherry stones will not. Wherefore you must procure (or make) a place of light mould, or black sand, and sow them therein in the like manner, as you did the Apple and Pear kernels; So will they thrive extraordinarily.

Peach-stones thrive best, when set in a loomy ground (such as serves to make bricks about London) mixt with some spit-dung, &c. I have known them inoculated the first year, they grew herein so bigge; the next unto this is that wherein

wherein you sow the black Cherries.

These are the cheif seeds to make stocks : but now to tell you, what stocks serve, for what kinds of fruit ; for there must not be a mixture of grafts and stocks of diverse Natures, as many (who treat of Miracles not truth) do deliver. Know therefore,

That the kernels of Wildings, for all sorts of Apples to be grafted on, are the best ; if you can obtain them ; if not, of any Crabbe (such as are in the hulls, out of which verjuice was prest) will serve the turn, if the Crabbs were not too small.

Some are of opinion that Apple kernells make the fittest stocks for the sweetest sort of Apples, but
of

of this I never saw the tryall, my opinion being wedded to the Crabb and Wilding; for as the same men affirme, the stock coming from the Apple is not so lasting.

All Pear-kernells, but especially those, that came from some what soure Pears, (such are these, that make the best Perry) for all kinds of Pears, Wardens, and Medlars, though these last are usually grafted on white-thorne; yet they afford larger fruit, when grafted on Pear-stocks, as I have seen happen by the experience of others.

The Service-tree both wild and planted is an excellent stock for Medlars, the fruit thereof being better relish't and thicker set on, then those of the Pear stock.

The separation of Crabb and
Pear

Pear-kernells is performed on this wise. After that the liquor hath been pressed forth of the bruised fruit, take the hull-cakes and rubb them between your hands, that they may loosen themselves from the kernells; then spread them on a blancket or winnow-sheet laid in the Sun, where let them dry for a while: Then take a wide sive and ridder them, so will the kernells drop forth, like as corn usually doth. If some of the smaller hulls do come forth with the kernells, they may be dryed a fresh, and shaken in a closer (or Raying) sive, whereby part will fall through, and part will gather into an heap, by the turning round of the sive, but a clean separation is tedious and unnecessary, if the kernells

hells are to be carried a great way, it is good to dry them again, least they grow mouldy in the carriage.

These and all other kinds of seeds here mentioned must be mixt with fine mould or sand in like sort, as plums are mingled in fine flower by the bakers, to make cakes withall, and kept in tubs or pots, neither too dry, least they wither, nor yet too moist, least they grow mouldy and rotten; let them therefore, if they are kept within doors, be watered now and then, and after every watering be carried forth an hour or two for two or three days together to receive the benefit of the refreshing Air; and afterwards cast into pots each kind by it self as before. Some men do keep them so mixt always without doors

doors where they stand to the adventure of all Weathers.

The stones of Plums, coming of a kind, whose bark is smooth and full of sap, are the best to make stocks for all sorts of Plums, and Aprecocks; more especially, if they are of a white Pear-plum, which also will serve indifferently for the more common sorts of Peaches. But

The generall and best approved stocks for Peaches, *Nectarines*, *Melocotoons*, and the rest of that tribe, are the stones of Peaches themselves, and among them, the *Melocotoon*, and such whose flesh easily separates from the stone: which stones (notwithstanding what I have said of seeds in generall) ought to be set early, or else (which is better)
the

the shells broken in such sort that the kernells be not bruised but carefully taken forth and then set like others : for the shell is a great hinderance, to the speedy and regular shooting forth of the tender seedling , yea many a good kernel is rotted before it can break through such a thick inclosure.

Some choise exoticke Plums and Aprecoks prove good when grafted or inoculated on Peach-stocks low on the face of the ground.

Almonds make a great shew the first year, whereby many have been invited to inoculate them with the best kinds of Peaches , &c. but the next year (or when they are once removed) they do for the most part come to nought, however
if

if any of Cherrys stand, they are never so good as these of Peaches. Aprecock stones are little worth, for they grow slowly, and are somewhat, to dry to inoculate on.

Black Cherry stones prest from their juice and washt from their flesh, make the only gallant stocks for all sorts of Cherrys, if planted in a blackish sand (as I have said) in three or four year they shoot both in length and bignesse almost beyond beleif.

The English Cherry called the Hony-cherry is the stock whereon the earlyest May's do grow, yet that fruit is not so good as that on the Black cherry, Enquirie and tryall may be made, how some Cherrys (especially the Morisco) will prove on the *Rhamnus catharticus*

ticus or the Harts Thorne. For the bark thereof shews that they will agree well together.

The young plants must be constantly kept clean, and sometimes the Earth between the ranks loosened by howing, or (rather) gentle digging, least they be overcome and choaked by the weeds.

If the young seedlings grow too thick, or too close to one another pluck up some of the weakest of them, and the rest will shoot the stronger, but of this hereafter.

CHAP. II.

Of the Nursery or place, where young trees are to be brought up before the Translating into an Orchard, &c.

BEfore that these seedlings be transplanted from the bed, wherein they were sown, it is requisite, that a plot of ground (to make a Nursery) be chosen fit to cherish and entertain them; the naturall (or genuine) soile, of which I advise to be between (or a mixture of) clay and sand, but therein the sand to abound ; if such with conveniency may be to this purpose acquired ; if not, any Indifferent [i. e.] neither too fat nor faint)

faint) will serve the turn. However the Situation thereof should be guarded, and fenced from the blasts of the *North* and *North-Western* Winds : for those are the greatest destroyers of buds in Inoculation & tender graftings; where you intend the Nursery shall be large, this choise will not be of such consequence, for one Tree will guard another. The place being thus chosen and designed, ought the year (or two) preceding to have been well soil'd and till'd for corn, or digg'd as for a garden; and at the *Michaelmas* (or at such time as the Crop is of) before the planting, Trenched [i. e.] digged two spit deep, the upper spit of Earth being turned in the place of the lower and the lower cast in the

C

room

room of the upper. The Superficies of the whole, lying in *Plano*, as an *Area* in a Garden, must immediately before (or at) the time of setting be spread over sufficiently with the best soil, (or dung,) such is that, that cometh from the Brew-houses ; which soil in the Planting is to be lightly turned into the Earth, more especially about the roots of the seedlings.

By this manner of Trenching and ordering the Nursery, Trees are caus'd to improve exceedingly : for the Earth, which before (like milk,) threw up and contained all it's fatnesse (or cream) on the Superficies, now feedeth the lowest root, that a young Tree is able to send forth : and although to some it may seem to have a disproportion

portion (or a part) of bad mould
 in the middle [i.e.] where the roots
 will shoot out the second year, yet
 may they understand, that, by the
 soaking (or sinking) of the soil,
 that was laid afresh on the new
 Superficies, and the rising (or
 ebullition) of the fat mould of the
 quondam Superficies, now turned
 two spit into the Earth, there will
 be a perfect mixture through out
 the whole, before the first year be
 fully ended. Besides this good
 mould, being thus under the roots,
 doth at once supply the stead of
 many dungings; which, though
 never so often repeated, will not be
 able to descend so deep.

As to the objection of others,
 (and those the greatest number of
 men that deal in Fruit-Trees,) who

say that by this enriching the Nursery, those Trees that are fetched from off thence will not grow or thrive else where, save in such like or better ground ; cause, if into worse transplanted, for the most part they dy : I must answer this, that no man (unlesse very idle or ignorant, and so unfit for employment in this purpose) would ever set a Fruit-Tree, but would prepare the place by soil , and melioring it before hand ; whereby it cometh to passe, that the Tree (though brought off a rich Nursery yet) is meliorated in the transplanting, which lasteth for at least two years ; that space of time being enough to keep alive and make grow the Tree ; after which it seldome happeneth, that any dy
 Year

Yea, granting the supposition, that the Tree is removed from better to worse, I can say, that it is a great furtherance to the quicker bearing of Fruit: hereby the sap, that in the Nursery spent it self altogether in effecting the growing of the Tree, is arrested in it's speed, and so digesteth, and prepareth it self in the Tree for the bringing forth of blossoms (and consequently Fruit) the next year after; this may be seen daily in the re-planting of Cherry Trees.

Moreover these people do not consider, that young Trees (like young cattle) do desire in their first years a tender education; which if not granted, they are hindred (or hide-bound) in their growth and improvement; where-

by it hapneth, that an inconsiderable dilatation of their branches, and in the end a mossiness affects them, though transfer'd to richer quarters ; where if they do escape those Maladies and thrive, their growth will be so fast, that for it no Fruit can be produc'd, and (which is the worst of all diseases) a Canker in few years stops the career. Most Apple-Trees give this experiment and observation.

But in these matters I do not take part with the too much enforced Nurseries : such being as lyable to reproof, for their over-doing, as these other (censures) are for their opinion in under-doing ; the first occasion and cause whereof was Laziness.

Having cleared the difficulties

ties about the choise of ground for the Nursery and the due ordering thereof before planting, I must now return to discourse of the work it self ; and before it, the season (or time of the year) is to be considered : This I find to be best, and safest from *Michaelmas* to the middle of *February* ; (when the weather is open ; for Frost will kill the roots in the Winter ; in like sort as the heat doth in the Summer.)

The earlyer removall, (viz. in and about *August*,) I dislike ; because of the danger proceeding from the checking of the Tree, before the sap be thoroughly hardned into wood ; by reason whereof the bark, being then too tender, withereth (or wrinckleth) and so becometh a dead cover ; when a live
Tree

Tree is expected. Secondly, for that hereby it is hindred of a second spring ; Lastly, because those fibers at root, which usually sprout forth upon such early setting, do perish in the Winter ; if the Frost be penetrating.

Yet when seedlings grow too thick, and your mind is to save them all, you may at any time throughout the whole Summer, by the help of a scoop like a paddle, after a watering, take up what number you please, with the Earth on their roots ; and reset them in a new appointed border, where with due watering and Shading they will scarce take notice of their removal, unlesse it be by a faster thriving, through their deliverance from the incumbrances of their fellows, and

and by being set at liberty in a fresher quarter.

The best way to preserve the close and low growers of Peach-stones is by the thus taking up of their overtoppers ; or (as the fancy guides) the lesser may be taken up, and the greater stand.

A late removall I affect not ; because the Tree benumbed (if I may so speak) by it's taking up, is to seek for nourishment at the roots, when it should be springing out in branches. Yet in the earlyer, Cherry-stocks (by care) do frequently grow, and Crabb-stocks in the latter. Now proceed I to the planting.

First let all the greatest sort of seedlings be taken (or drawn) up by themselves, slip (or prune) off
all

all the side-branches (if there be any) from them, leaving only the middle (or upright) Stemme standing, which may be a little topped too, if it be taper, then cut away all the fibrous roots, (that the Earth may close to the main,) and good part of that root, which commonly groweth directly downward: for thereby fresh roots will spring forth at the sides; and because that direct descending root shooteth most commonly deeper, then the good mould extendeth, which is one of the causes of barrenesse in Trees, trimme also the ends (when there are any) of the side roots. Having done thus, and designed the plot in the Nursery, where they should be set, extend a Garden-line a crosse the breadth of

of the said plot at one end thereof, by the guidance of which line digge a small trench, not much deeper then the roots of the young plants, (newly prepared as afore-mentioned) which you must place therein, one plant half or three quarters of a foot distant from another ; so causing their heads to rest directly erect on the line : then throw the mould [mixt with the dung, that was spread over the superficies of the plot, as I have said,] on the roots : and shake the plants, one after the other, somewhat after this loose covering, that the Earth may be fitted on every of the roots, and that the plants be not buried too deep in ground : after which you ought to tread the Earth, pretty hard for
the

the firmer and better closure thereof to the roots in generall, but in this fixing of them, there must be a regard had, they stand upright by the line, as at the first placing. when the rank is fill'd up in this manner, remove the line from thence 2 foot (or a space sufficient for men to passe to and fro, to inoculate grafts and prune them, and for them to spread) then set others in the like form, as the former : do thus, till all the greater sort of seedlings be spent. Then deal in like order with the second sort, or those of the middle growth, but as for the least, let them grow an year or two longer in the beds, where they were Sown, (for even the worms will turn out of the ground such tender roots) then set them

them in like manner, as the other two were before. Some planters make holes by the line, with a dibble or settingstick made of the handle of a spade cut picked at the end, into which they put the seedlings, and (by treading) close the Earth about them. But this manner of setting serves not for those plants that have side-roots, because the holes without some trouble, cannot be dilated to admit them : neither is it altogether so good for those that can be so set ; because the Earth is clotted by the dibber, as it maketh the hole ; where upon it cannot so exactly encompassse the roots, unlesse with a spade, or trowell, it be thrust close to them, which is a trouble exceeding that of making a small trench as is
before

before directed. Observe, that all seedlings one time or other must be removed, by reason of the direct descending roots: as is above specified.

Those Plum-trees, you intend to inoculate Aprecocks, and to graft wal-plums on, as also Peaches, must be set a somewhat greater distance in the rank; because that their spreading ought to be low, unless you are certain to remove them the next year after their insition. keep the spaces between the ranks clean from weeds, by once (or twice) howing them, in the Summer, if you have so much leisure: however at the Winter fail not to digge them over a fresh, for the better mixture of the Earth and soil; and for the refreshing
of

of the roots by the rain, which here by hath the freer admittance into the Earth. Some years, when you have perceived the former dung devoured, and the heart (or fatnesse) of the Nursery to faint, by the slow shooting of the spriggs and grafts, lay on fresh dung, and turn it in by the said winter-digging.

At Al-hallontide (or there about) cut of all the side-branches (or spriggs) from the Plum-stocks & Cherry-stocks every year; leaving the upright one, (or that that is intended for to graft or inoculate on,) standing against another year, for a leader : this labour may be spared, when the stocks are reserved for the wall, or to be dwarfe standards, in which a low grafting, and inoculation, is to be used.

The

The contrary kind of pruning
 [*i. e.*] by cutting of the erect
 ascending branch) may be used
 to Crabbe-stocks and Pear-stocks,
 for to make their bodyes grow
 bigge and not toppe-heavy : or it
 is not of much moment, whether
 you use any, when that you have
 about two, or three, foot of the
 stocks clear bark't above the
 ground ; for that will be high
 enough to graft them on.

CHAP.

CHAP. III.

*Of Grafting and the severall
fashions therein.*

WHEN the Crabb-and Pear-
stocks have thus stood, and
grown in the Nursery, two, three,
or four years, according to their
improvement in bignesse ; then the
grafting must be thought upon, and
effected.

But the Winter before [*i. e.*]
(between *Michaelmas* and *St. An-*
drews-tide,) let their branches and
heads be cut off, an handfull or
more, above the smooth place ap-
pointed to be grafted on. This cut-
ting of the heads is for the better
arresting the sap in the main body
D of

of the stock, which doth hereby become the more turgid in it's bark, by being thus hindred of it's vent ; for the sap (more especially the more serous part thereof) is not wholly spent, till the great Frosts in Winter, as may be seen by the long continuance of the leaves on the top-branches, and their softness. Now, I say, it is hereby restrained to the greater effusion of it into the graft (instead of it's own toppe and branches) the next spring.

Cherry-stocks, that you have reserved for standards in Orchards, must not be thus dealt with, but the side-branches (as I have said) only pruned of the stocks ; because they must be grafted at such an height, as the Trees are to spread :
for

for Cherry grafts (for the most part) immediately expand themselves into branches on the head of the stock, neither will they grow any higher in an entire body.

Thus much to the preparation of grafting, whose cheifest time is *February* and *March*, the weather being warm, [*i.e.*] without Frosts or cold Winds, *February* for Cherries, and most sorts of Plums, *March* for the latter kinds of Plums, and for all the species of Apples and Pears. Yet some have, in the variety of their practice, adventured to graft from, and in, *November*; as also in *Aprill*, both which have happened to grow well: but these are but nicety's, the surest grafting being in those two months, I now have named.

Now the manner and several ways of Grafting, (which notwithstanding the difficulty to attain without ocular demonstration) I will in this place endeavour to describe.

First there is the most vulgar called stock-grafting, or Cleft-grafting. To do this, cut off the head of the stock smooth, at the place where you intend to fix the graft, then cut the graft like a wedg for two inches, (but) with shoulders on both sides at a seam, or (which is as well by mine own triall) an eye ; the inner part (that is to be placed within the wood of the stock) being made somewhat thinner then the outward, which with it's bark is to join to the bark of the stock; the graft thus prepared must

must be laid down in the basket or put in a dish of water till you have cleft the stock, (a little beside the pith,) with a mallet and sharp chisell, or knife, without bruising the bark. Into this cleft, which if rough, or continued with strings of bark one side to the other, must be shaved smooth with a penknife, from the bottom (upward) to the top ; and if too short must be made long enough to receive the wedg-part of the graft: put a wooden wedge, about the center (or middle) of the stock to keep it open for the graft, which must then be fitted thereunto exactly, so that the shoulders on the top, and the sides ; the insides, not outsides, (as by many mistaken, whose work thereby came to nought,) of

the barks, both of the graft and stock; they touching one the other, almost as even, and close as two peices of wainscoat shot by a joiners plain. When you perceive, that they will do thus, let the graft alone in the cleft, and pull out the wedg, that held the cleft open, but if you find the graft will be pinched by the stock, leave a little peice of a wedg in the middle of the cleft, to keep it from pressing too close thereon: if the stock be big enough, another graft may be placed on the adverse side of the stock in like manner as the former.

This way of grafting (though universally known, and practised) is not good; because the heart of the stock is wounded, and the rain (or moisture) oft falleth into the cleft,

cleft, and where likewise Earwiggs, and such like Vermin find harbour; both which are causes, that the head of the stock often dyeth, or rotteth away, before the bark hath encompassed it.

It is better therefore, (if by a cleft you would graft) that you cut the head of the stock aslope [*i. e.*] (oblique descending) like a Colts-foot (from the similitude whereof, this manner of grafting hath it's denomination,) but plane a little, on the top, where the shoulder of the graft is to rest. The remainder of the work is after the same order, and fashion, as in the former.

By this way the stock admitteth only one graft ; you may therefore make two slits, or clefts, on each side of the pith one, for two severall

rall grafts , if the stock be large enough to contain them.

This cutting of the head of the stock a-slope, doth in part (not wholly) divert, and avoide the mischeifs of the former. This stock grafting (or the former) must be use^d when stocks are thick set with knots ; but in others it pleaseth me neither , for I find these ensuing ways to be the more excellent, as bringing in their operation lesse danger to the whole, and as, being finished in a shorter time.

Whip-grafting (otherwise called Backing, Packing, or Splicing) is thus performed ; After the stock is cut even, as in the first or second grafting, you must cut your graft on one side only with a shoulder, very even and smooth, descending
like

(like the side of a wedg) till the point (or end) thereof sharpeneth it self in the bark, that is on the opposite side of the graft, this shoulder must be made a little beneath an eye (or bud.) The other side must be left whole and intire, with another eye (or bud) on it, about the middle, from the shoulder, toward the bottom, or end, which must be distant two inches (more or lesse) from the shoulder. The graft and head of the stock being thus prepared, lay the cut-side of the graft on that side of the stock, that hath the smoothest bark, (the shoulder lying exactly on the top of the stock,) and mark with your penknife-edg the place, to which the bottom or end of the graft extendeth, then (having laid the graft by)
with

with the penknife cut a slice (of
 such breadth as you guesse the fl
 side of the graft to be) out of the
 bark to the wood (and some part
 of the wood, when otherways it
 will not be broad enough) from a
 little below the place, you did mark
 at the bottom (or end) of the
 graft, to the top of the stock. This
 done ; see whether the inward part
 of the bark of one side, and the end
 of the graft, fit to the inward part
 of the bark (or the narrow space,
 or line , between the bark and
 wood) of the stock, in the room
 of that, which was sliced off by the
 penknife. It is not so materiall,
 whether the other side join so ex-
 actly : nay I rather advise , that
 that side of the graft fall somewhat
 within the wood of the stock ; for
 thereby

(of thereby it will sit the cloſer and
 fl firmer to the former ſide. If the
 the ſtock be big enough, and you have
 an a mind thereunto, you may place
 it another graft, after the ſame man-
 a ner, on the adverſe ſide of the
 rk ſtock; but whether you graft one
 he or two, you muſt with one hand
 is hold them on a right, and with the
 rt other (if that none other perſon be
 d there preſent to help you) bind
 rt them faſt on the ſtock, (ſtaying
 e the bond with the hand, that holds
 the grafts,) with a ſoft flag, ruſh,
 d peice of baſſes or inward rind of
 any Tree, or ſuch like.

Obſerve in this place, both for
 this and all other kinds of grafting,
 where the grafts are to be thus
 bound on the ſtock, that you loo-
 ſen the bonds at ſuch time as the
 grafts

grafts have grown a little, for thereby they escape the dammages that ensue by pinching.

Another way may be termed shot-grafting; for, if we can understand small things by great, it is like the shooting of two peices of timber (as in a Ship-mast) together. The graft is prepared, and the whole operation performed, after the same manner as before in Whip-grafting, from which it varyeth but little, and that is, by cutting away the wood of the stock like the graft, if you would graft with a shoulder; if not, it is no more trouble then to cut a slice of two inches (more or lesse) long from of the graft, and the like from of the stock, and to place the one upon the other in the same fashion

as in the other. But yet the graft groweth the surer, if the bud on the back be (or ly) beneath another bud on the opposite side of the stock ; for by the bud, that is on the stock, lying higher then the bud on the graft, the sap taketh hold on the graft in it's passage thereunto.

This way is most used, when the graft and stock are of equall bignesse ; but it may serve very well also, though the bignesse of the stock do somewhat exceed that of the graft ; so that they close on one side exactly, as I have mentioned in the former.

There is a way much used by some of the best Nursery-men about *London*, and indeed very easy and certain, which is performed
on

on this wise. First they cut of the head of the stock on the side, where the graft is to be put, descending or a little bending downward, and not altogether flat, when there is but one graft intended to be placed thereon; but when there are two grafts to be inserted on the same stock, it must be cut flat, or (which is better) with a ridg (like a cheveron in Heraldry, or the tops of two rafters coupled) in the middle.

Then they slice of a peice of the graft in the same fashion, as is described in the second shot-grafting way; the stock, if somewhat big, is dealt with as in Whip-grafting; but if little, as in shot-grafting, these things being thus accomplished, and the sliced side of the graft found

to

to agree to the sliced place of the stock ; then they slit the graft (gently, least the bark should be hurt) on that side that is to ly on the stock, from within half an inch (or lesse) of the end, (or bottom,) to within (about) half an inch of the top, or where the slice began ; the like they do unto the stock, so that on them both there is (as it were) a tongue : now they put the tip (or point) of the tongue of the graft into the slit of the stock, and the tongue of the stock into the slit of the graft, and guiding them even on one side they thrust them gently (the one tongue within the other) till the bottom of the graft come to the place of the stock, whereon it is to ly. Last of all, they bind it, as in the two last preceding ways. This

This grafting I account the best for it's certainty and easy accomplishing, as I have said : very certain it is, because that by the making and placing the tongues, the one within the other, it commeth to passe, that the graft may be fed in three severall places by the sap ; whereas in the other ways of grafting it receiveth it's nourishment, but in one or two at the most. It is easy likewise, as having lesse trouble in the placing and binding, the others of that kind ; for the grafts stick almost as close to the stock in this as in cleft-grafting.

In Grafting between the wood and the bark, the head of the stock is cut off flat and smooth, as for cleft-grafting ; and the graft prepared in the same fashion, as in
Whip-

Whip-grafting : which being effected, and a style of iuory, box, or such like hard and smooth wood cut like (though somewhat lesse then) the end of the graft, provided in a readinesse ; you must make a place for the graft with this style, by thrusting it (but not rashly, between the wood and the bark (on the smoothest side) of the stock, as deep almost as the cut part of the graft is long, then, having pulled out the style, put the point of the graft in the room thereof, with it's cut side close to the wood of the stock ; continue the thrusting it (gently though it be stiffe in going) down, till the shoulder of the graft rest even on the head of the stock, and then the work is finished, save that, least

E

the

the wind, or the very putting on the clay, should shake it, you must bind it, as in others.

This way of parting the bark and wood pleaseth me not very well ; because herein the bark will rise on both sides the graft, farther then is requisite ; or if it be not so flexible, it will either not part clear from the wood, or else it will pinch and bruise the graft in it's passage. All which do (as I have known) frustrate the labour and expectation. Some , to avoid this danger, cut the graft on both sides, without any shoulders, like a sharp wedg ; and so thrust it between the bark and wood : but hereby likewise too great a wound is given to it for to come to good ; though I deny not, that it may happen to grow,

grow, if the sap can take hold on any place thereof in such sort as that the back part may in a short space be covered afresh.

Instead therefore of these I have substituted, and made triall of another way, taken notice of by few, though the most neat, and least dangerous, and hurtful for the grafting of great stocks. The operation about it is somewhat agreeing to that of inoculation, from which because there is some variation, I will here set down the whole in the same order I was accustomed to do it. First I cut off the head of the stock (like the coltsfoot) a-slope, and at the very top flat, for about half an inch, on the side, where I place the graft. Then I fit the graft like unto that for

Whip-grafting, save that in this I cut the pith, and middle part of the wood, from both sides somewhat hollow scoop-like, that the outsides thereof might stick the compleater to the stock; from whose top I draw a slit, with the point of my penknife, through the bark, direct downward, of an inch or more in length. Then I raise the bark on both sides the slit by the back of my penknife, to receive the point of the graft, which being put therein, I thrust the cut part down between the wood and the bark, till the shoulder thereof rest on the top of the stock, as it doth in others.

Now although the bark of the stock was not opened, nor slit the length of that part of the graft that was

was to be apply'd to the wood ; yet will the point of the graft, by this gentle thrusting down, cleave and dilate the bark wide enough to receive it most exactly.

When the stock is of a larger size, I set another graft in like sort on the same side, but distant from the other about an inch ; and if the stock be very big, (such are the arms and bodys of Trees) I place others, with oblique shoulders, to fit the sloped part of the head, and one without any shoulder, at the lower end of the Colts-foot.

By this flitting of the bark I eschew the inconveniency's of the other graftings between the wood and the bark ; for herein the bark opens no wider then to receive the graft, whom likewise it cannot by

ing oppresse. Yet sometimes it falleth out, that the bark of an old stock is so thick, that it will rise, further then is needfull, as not being able to turn short enough, only for the admittance of the graft; wherefore I pare, and cut away some part thereof on both sides the slit, whereby that mischeif is prevented.

All sorts of grafting between the bark and the wood; for the most part are used in juicy-bark't stocks; or late, [*i. e.*] when the sap be- ginneth to arise, otherwise to make them part clear will prove a difficult matter.

Some Trees there are, whose cions will not be grafted, if taken clean from the Tree, whereon they grew at the first; with these you must

must deal in another method of grafting, called inarching. To effect this, you must, an year or two before hand, plant some stocks so nigh the Tree from whence you would graft, that the cion, which is to make the graft, may by that time extend over the head, of the stock, when it is cut and cleft, about five or six eyes, without any difficult straining or pulling of it; from one of these (suppose the fourth) eyes, it must be cut with cheeks, or shoulders, from which, about two inches in length, must the bark and some part of the wood be smooth and evenly taken of on both sides, like as in Cleft-grafting, save that herein the graft is not cut off like a wedg, but ought to continue on the Tree, without hurting

ing the outside bark in any place. Then, in the cleft of the stock, prepared (as hath been said) to receive it, in like order and form, as in Cleft-grafting, must you place that part of the graft, where the bark was taken away next to the shoulders, as far as may; so that the lower part thereof, which joynes to the old Tree, and is the thickest, do not cause the cleft to open at top from the shoulders set thereon. When this is done, bind it upright so fast, that the wind, when it shakes the Tree, from whence the graft is binded, may in no wise loosen it.

Now, though this be the most usuall way of Inarching, I know and do find, that the working whip, or (rather) shet-graft fashion is beter,

better, for the grafts are not so subject to break, neither is there so great a wound given to the stock by this, as by cleaving.

Another manner of Inarching, where the wood of the cion is not too brittle, is by cutting the head of the stock, like a wedg, for an inch and an half: and then to cleave, or slice, out of the cion, a tongue somewhat more then half way through; of the same length, as the wedged part of the stock is; for the end of the tongue must extend to the place, where the bark of the stock began to be sliced for to make it wedg fashion. Being thus cleft it must be placed riding astride on the edged head of the stock, the tongue on the one side, and the part that holds on the old Tree,

Tree, on the other side of the stock lying, as in Whip-grafting, or, in short, the whole is like cleft-grafting revers't; for the graft, by being cleft, in this imitates the stock in that, and the graft of that shews the fashion of the stock in this; the difference is, that herein the stock must not be cut with shoulders, nor the tongue flat, but descending, till it end sharp in the bark, as the cut part of the graft in Whip-grafting. This manner of Inarching I approve of, as the best, when it may be effected; for that the graft can herein receive the sap from both sides the stock, if it be well guided in the binding thereon.

In these inarchings the old Tree feeds the graft, till such time, as it is united to the stock, and groweth firmly

firmly there with ; which will be before the Summer is ended: so that the winter following, it may with safety be cut off, from the old tree, close unto the stock, on which it will have made a very great growth by double feeding.

In an year or two store of Apre-cocks, without inoculation, may be produced, if that before hand Plum-stocks be set round about an Aprecock-Tree at such a distance as that they may be grafted by these ways of Inarching.

By the same also a cion, or a great bough (if the uttermost point of a branch thereof be cut like the lower part of a graft) may be made to grow, with the lower end upward, whereof I have known the experience, whereby that foolish

lish traditional opinion of having fruit without stones or kernels was confuted ; for the fruit proved to be of the kind and manner with that of the Tree, from whence the cion, or bough was inarched.

These are the cheif ways of grafting, some whereof are necessary, for a compleat grafter to know, other some meer curiosities ; but there are other variations, which I purposely omit ; supposing that from these, as from the cheif heads, an ingenious lover of this art, will of his own industry, discover and improve them, to his greater pleasure, and content.

CHAP. IV.

*Certain Rules to be observed in
and after grafting.*

FOR the better detaining the grafts in their right posture, and for preserving the sap, at the grafted place, in the tender growing, from the extremity of heat and cold, adventitious moisture and driness; like as an Emplaster on a wound, in all Graftings there is to be used a loom or compost of clay and horse-dung or such like. The best, that I find, for this purpose is made on this manner: *viz.* Take of clay one half, new horse-dung, and cow-hair from the tan-pits, of each one fourth, which make

makes the other half ; mix all these very well together, by kneading, beating, &c. with it cover over your stock in the grafted place, about an inch above the head, and a little beneath the point of the graft: the whole representing an egge or a ball of an ovall forme.

When the grafts have grown somewhat, then pull off the loom, and the bindings of such as required binding, and put only a little of the like loom on the head of the stock, to keep it from the heat and wet, or, if your leasure gives leave, daube them over afresh, yet not with such curiosity as in the former. As for the smaller sort the renewing the loom is altogether unnecessary.

Before the grafts do grow, the
stock

stock will usually send forth some
 shoots out of it's body; which must
 not be rubb'd of (as is commonly
 practised) till the graft grow ; and
 then, if the graft be free in grow-
 ing, all must not be pull'd of at one
 time, but one, or two, left to pre-
 vent the ascending of too much sap
 into the graft : for by it the Tree
 will grow lop-heavy, and the graft
 toward that winter, or the next
 year, corroded with a canker. In
 this I seem to many paradoxical ;
 because that they, by thus doing,
 think to force up the sap into the
 graft : but experience hath shewed
 me, that, when the buds are not
 suffered to stand till that time, the
 stock will either dy for want of ven-
 ting it's sap, or, at the best, the root
 will endeavour to send forth suck-
 ers,

ers, whereby the grafted part is weakned, if not gone, and the pains most commonly comes not to the wished effect. Besides the buds, that are toward the top serve to draw up sap the nigher to the graft, which the graft it self through wounds and weaknesse is not so able to perform. But if you find, that the graft in it's growing shoots but slowly, you may then pick off all the springs from the stock, and not before.

At *Michaelmas* prune off all the irregular, and side branches from the grafts, leaving only that, you intend for a leader, or to make the body of the Tree; do thus to them every year, till those, you reserve for standards, are shot up to the height of a man, or a foot lower;
after

after which time the upright branches may be taken away, and three, four, or five of the side ones, remain to make the spreading arms of the Tree.

The vulgar grafters do always pick off the side buds, till such time as the Tree is high enough: but herein they erre; for by that means the Tree grows taper, and not able to stand by it self, without a stake to hold it upright; whereas if the side buds be suffered to grow afresh from year to year, the body of the graft will be big, and strong enough, to maintain it self against the winds; then may it by pruning (as afore said) be raised to such an height you please, to which speedy rise these men only aim at, not regarding those now menti-

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oned

oned inconveniencies. The body of the graft, being thus kept low to grow big, doth likewise cover the head of the stock much sooner, then when it is strip't up to such a taper dimension.

Trees, that are for the wall, must be made to spread very low; therefore leave three, or four side branches, constantly cutting away the upright.

Dwarf standards at the height of an yard at the furthest must be made to spread as tis elsewhere spoken of.

As for the choise of grafts I advise, that they be taken from the fairest and best bearers, large, full-eyed, and smooth-bark't, of the last years shooting; when you graft, cut off the heads, and let not above
four

four buds remain, on a graft, above the loom for Appels and Pears. In Cherrys and Plums two will be enough, because, for the most part, they send forth new branches out of those that grew at the first hand of the year, which Appels and Pears (unlesse the tops be broken) do seldom adventure to do.

An old Tree which is a good bearer seldom affordeth cions for grafts; wherefore some cut off a bough from the Tree the year before, to cause the Tree to sprout forth at that place. But usually the sap of the Tree, striving only to cover that place neglecteth all irruption thereat.

What grafts take on what stocks hath been shewed in the first Chapter.

CHAP. V.

Of Inoculation, &c.

A Precocks, Peaches, Nectrines, and such kinds of choise fruit, are seldome procured by ordinary grafting, because they bring forth blossoms before the young shoots; so that the graft, missing the usuall method of it's kind, withereth away, as not able to stay, so long for a conglutinating juice, when the season is to be in flower, and if the stock should endeavour to preserve the new union by throwing up such a sap, yet will the graft refuse it for the same reason, whereby it turns to a killing gelly; but this seldome happens,
for

for these earlier kinds are calling for nourishment before the spring is strong enough to awake and rouse it in the stock. There is therefore another way invented to increase them, and this is called Inoculation, or Budding.

The time for it is principally from a fortnight before *Midsommer*, to a fortnight after, when the buds and bark are newly hardened enough to part from the wood, and that without any difficulty. Yet if the Tree hath been forward in growing that year, the buds will be fit to inoculate with, even in *May*; and if backward, then to the last of *July*.

Apereocks are the first to be inoculated, and Peaches the last, and between both all other kinds of fruit.

Those sprigs, that shot that year biggest and fairest, afford buds for inoculation, only toward the bottom, or (rather) the middle half way and more ; so that the top must be cut of and thrown away : for the buds thereof are always too tender to part from the wood, as the lowest are oftentimes too old and tough.

These sprigs, or cuttings, must immediately be wrapped up in some wet linnen cloth, or (which is surest) their lower ends stuck in clay and the whole body of them enclosed with watered mosse and so put in a box ; if that they are to be carryed any long way, or must continue any space of time, before the inoculation ; for otherwise in lesse then six hours they will wither
or

or prove very difficult in the separation. Now you having obtained such cuttings and brought them on this wise to your stocks, cut of all the leaves, reserving only the stalk of them (or, if you perceive that will be too short, a very little of the leaf also) to hold them by in the work. Go to your stock, and in the smoothest place thereof (somewhat low) cut a transverse cut, with an even and sharp edged penknife, three quarters of an inch (or more) in length : from the middle of this cut, or line, draw, with the very point of the penknife, another cut directly downward of an inch, or such like length, within a little, as the escutcheon shall be. But neither cut ought to be deeper then the bark. Both of them joined thus together

together are represented by a great T.

And that you may not be deceived in your work, open with the back of the penknife (toward the point) the direct descending cut a very little at the top thereof, where it joynes to the transverse cut, only to se whither the bark will part easily from the wood ; if it will, then let it rest, till you have prepared the bud to put therein, which you must do on this wise : having designed which bud shall be made use of, cut with the penknife a transverse cut, half an inch, or lesse, above it, cut the like beneath, both quite round the shoot. Then draw the side-cuts (on each side the bud one) from the cut above the bud to the cut beneath :

beneath : these cuts are not to be drawn parallel, to one another, as the transverse ; but oblique descending, meeting thereby in an ovall point at the lower transverse line : so that the form of the bud, with that part of the bark, that is to be with it, is like an escutcheon, in the same manner as is expressed in the margent ; the point in the middle sheweth the stalke of the leafe, and the bud before it. These cuts being thus made with the knife, peepe away the bark of the shoot, between the transverse cuts, that is on the side opposite to the escutcheon. [Thus far of the preparation may precede the cutting of the T in the stock, but I place them together, as being lesse trouble to the understanding of the descrip-



description, but to proceed.] When you have done this, cut a small notch above (but ending in) the upper transverse cut, to admit the quill or Steele that is to take off the escutcheon. Then thrust this quill or Steele in that notch between the bark, or escutcheon, and the wood, very even and steedy, that so the escutcheon may be taken off without bruising. Observe after it is taken off, whether it hath any hole withinside at the root of the bud, if it hath, cast it away, as unmeet for that purpose, and prepare others in like sort, till that you have one without any hole at the bottom of the bud, which being procur'd must be laid on your lip, to be kept moist, or put in a dish of water till you have nimbly opened the

the descending cut in the stock with the back of your penknife, without touching the gelly or moisture on the wood, into which immediately put the escutcheon on this wise ; take it from your lip and pour out the water by the stalk of the leafe, and hold it and the bud close (though not pinching) between your forefinger & thumb; in which posture, thrust the point thereof into the top of the descending cut between the bark (you newly opened) and the wood of the stock, so by degrees draw down the whole escutcheon, if it be somewhat stiffe (as it should) in drawing down, lay the back of the penknife on the stalk, close to the bud, but not on it least you bruise it, place likewise the top of your thumb underneath the

the stalk, and presse it down by the back of the penknife with your other hand, till the upper end of the escutcheon come within a little of the transverse cut where it must be cut off with the sharp edge of the penknife, which will by that means fit it exactly to the bark that is above. But if the going down be very difficult, then may you open the bark by the back of the penknife a little, on the sides and beneath the escutcheon, as he stands on the stock; then presse it down as before.

When you have thus finished, bind the whole with some soft flag, bull-rush, woollen yarn, or basse, pretty straight, beginning at (and upon) the transverse cut and so winding downward, till all the escutcheon

cutcheon be covered with the binding : but be sure, not to touch the very bud, but to skip it, lest it should be bruised ; however let the binding be placed close above, and beneath the stalk of the leaf, under which the root of the bud lyes.

Some open the bark of the stock, before they take of the escutcheon, but in my mind they do not so well therein ; for if the root of the bud should (as it often doth) happen to be broken in the taking off, the air and heat doth often dry the place, that is prepared for it, before another bud can be made ready to be put therein : but men may do herewith, as it best pleaseth their fancies.

If that the stalk of the leaf will
fall

fall off, before the escutcheon can be brought to it's proper place, or where there is no stalk at all, but a bare bud, you may stick the point of the penknife somewhat beneath the side of the bud, and draw the escutcheon down, as well as if it had a leaf-stalk thereon.

The style, that taketh off the escutcheon, is a quill cut two third parts away, sloping downward as for a pen, and at the end, instead of a nibb or point, with a flat round edg. After the same fashion many procure a steel one (well burnish't) to be made for them, which indeed is better then the other, but the best is an Ivory one, cut in the same form, which seldome hurteth the root or gelly. |

Many there are who take off
the

the bud by thrusting the style from the point of the escutcheon upwards : but in this the edge of the style must be kept close to the wood, whereon the bud groweth ; otherwise it will glide between the root of the bud and the bud it self, rendring it thereby unprofitable for inoculation.

Others never use a style, but make the upper transverse cut on the cion at a greater length, or distance from the bud, so that they may take hold thereof with their penknife and thumb, thereby pulling it leasurely, till it comes (or is peeled) off. What is bruised by the taking hold of it thus, is cut off at the transverse line in the stock, before it be quite thrust down in the same order, as in the other before.

This

This is the quickest and safest way ; for the bud and inward bark are not touched hereby, as they are by the style in the other, which (unlesse very smooth and round edged) often maketh the same rugged, to the indangering the whole inoculation.

The next best unto this is the taking off the escutcheon, by a suddain and equall twist of the forefinger and the thumb, as you hold it between them. There is a way to inoculate, whose fashion is contrary to this ; for in it the transverse cut is made beneath the direct descending line, both which therefore are like a great **I** revers† ; so that the escutcheon must be cut revers† likewise, and the whole operation performed from the lower
part

part upward. This ; without doubt, is a very good way, and the bud likely to take ; but I dare affirm nothing of certainty therein, because my self have not as yet seen the tryal thereof in fruit-trees ; having received the hint hereof from an Orange bud , which (though otherwise very difficult in propagating) hath by this way taken very well.

A freind of mine did once use to inoculate, without taking away the wood from within the escutcheon, which many times (especially in moist years) hath luckily proceeded : but it is not so sure as the other (whose trouble, I confesse, is the greater) because that the sap of the stock cannot so compleatly annex it self to the new adopted bud.

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There

There are other (but fantastical) ways of cutting, and placing on the bud, such are the fashioning it Lozenge-wise, and like the leaves of a book opened, &c. but I omit their description, as uncertain in themselves, and therefore unnecessary to my discourse.

It is (and hath been) a great tradition among divers Gardners that no bud will take, if any adventitious moisture touch the root thereof, before it be inoculated; but this I know to be as frivolous a rule as hath been invented, for it is not only good, but very necessary in dry weather, to dip the escutcheon in water before you put it on the stock, for thereby it will slide down the better into the slit.

All inoculations succeed best,
when

when they are done in a gloomy and cloudy day ; now if there be none such in the season, but the weather prove wholly dry, and parching, it is best to work somewhat early in the morning before the Sun make the day too hot, and in the afternoon, when the heat is abated.

To prevent that the heat do not so much mischeif, as otherwise it would, ty or hang some cabbage-leaf, or such like, over the buds after the inoculation ; under this shadow will they be in some measure preserved.

When the weather hath been and is extraordinary dry, it is of good consequence to water the stocks 2 or 3 nights before the inoculation, and the like, after ; for that

by the former the bark will rise the better ; and by the latter the new adopted bud will receive the greater nourishment : yet in the watering after, there must be a caution for overdoing, least insted of affording liquor to a thirsty plant you make it drunk, which will appear in the spuing up of a gum at the place, to the buds destruction.

Within ten or fourteen days, if the inoculation be done before, or about, *Midsummer*, the bark will happen to swell ; wherefore the bond must be taken off, or loosned, least the bud be destroyed by pinching.

But the true time of loosning the bond will be best known by the goodnesse and smoothnesse of the bark of the stock ; for some stocks
(such

(such as are full of sap) will in a shorter time swell out, and extend the bindings, when as others, that are dryer, and inoculated late, require a longer time, before that the bond will be streightned.

In dryer weather the bud requires the longer time, in moister the shorter for unbinding.

It happeneth sometimes that in four, or five dayes you may know whither the bud have taken or no : for if then it look fresh and green, as when it came of the cion, it hath taken ; yea, although the stalk of the leaf will at the touching fall off ; that being caused by the bruise, it received either from the back of the penknife in the depression of the escutcheon, or else from the streightnesse of their binding.

Because of the difficulty of one single bud in running through all the hazards, it is necessary that three, or four, buds be placed on the same stock; where, if none have come to good, the inoculation, especially when you began the first early, may be renewed severall times, untill you are assured that one on every stock will answer your desire.

Rebind the buds loose, &c. when the weather is very wet, for else the bark of the stock will open from the escutcheon.

After the unbinding there remains nothing to be done till the next Autumne or Winter; at which time you must cut off the heads of these stocks two inches from the bud, and the next year close

close to the shoot, that grew out of the bud, then it were good likewise to cover it with loom as in grafting. If you should the first year cut off the stock close to the bud, 'tis ten to one, but that the head thereof with the bud therein will dy; Besides the leaving of the head thus long, more especially with a natural bud on it, serves at the spring to convey and attract the sap into the bud that is inoculated; but all other buds below ought to be rubbed of; and that above too, when the inoculated one hath shot two inches long.

After an early inoculation, wherein the buds held very well, that I might see varietyes, I adventured to cut off the heads of some plump bark t stocks; whereby it came to
 passe

passé, that the bud immediately sprung forth a considerable length, able enough to withstand the piercing winter, yet this is not of such certainty as the not permitting of it's growth till the next spring.

The inoculation of Roses (which most account a difficult matter) comes best to effect this way; for it is seldome seen that their *Midsummer* buds do stay so long as the spring, from shooting forth; such shrubs if observ'd, continue always growing, unlesse impeded by the Frost, which is no sooner over, but they (even in the mid'st of winter) thrust out their heads again, to the often nipping of many of them, amongst whom the adopted are likelyest to suffer, if the head was cut off just at that
winter

winter season ; wherefore it is (as I have found) the best course to cut off their heads four or five days after the unbinding, whereupon they will immediately shoot lustily enough to withstand the encounter of the winter, like unto other Rose-Trees, that are clipped after bearing. But this is somewhat beside my purpose ; I now return.

As to the Stocks, whereon each kind should be inoculated, see in the first Chapter.

Those Trees thus inoculated, may, even in the bud, thest next Autumn, be removed, as well as when they have grown an year or two ; yea I find it best so to do : for there is lesse danger in transplanting Trees (such are these) whose heads are cut of, and they thereby

thereby pruned, then those, whose branches must be left at full length. Yet it may prove a losse to the buyer, if the bud should chance to miscarry.

If the winter and spring prove very frosty, it is of a very great concernment to wind wisps of straw round the buds, during all the season of cold ; for thereby the tender buds are preserved, which otherwise by the peircing of the Frosts are oftentimes destroyed. If such kind of weather continue long, you must sometimes unwreath the straw, from off the buds, for an hour or two in the hottest time of the day, to give them fresh air, and afterwards wind them up as before. Many men, being ignorant of this guarding the buds,

buds, have lost multitudes, which held very well and continued fair a long while after the inoculation; admiring in themselves, why the Tree sprung not out at the season, when as they were all killed the preceeding winter.

It will not be much from our purpose, as a close to this and the other Chapters, to seek out and assign, for the satisfaction of some, the cause why the greatest part of Trees yeild better and fairer Fruit, through insition, then, when permitted to bear from seed. Now whereas I cannot so exactly fetch the resolution hereof from the insensitive Tree it self, whose method of separation avoids even the clearest eye; I must by comparing Trees and animals find the full determination

mination thereof, yet so, as that I abstract the same from the faculties of sense and motion, and speak of them only as to augmentation. Whereas therefore it cannot be made appear, that there is any great difference between a beast and a plant in their nutrition, the one therefore will demonstrate and clear the other. Thus then; As the Chyle which is separated from the digested meat, thrown into the guts, for a further purification or concoction, hath other vessels to secern it from it's several excrements, before that it is fit for the nourishing of the particular members, who in themselves likewise have an attractive force to elect the meetest thereof for their own increase, and being there which sufficed,

ced, by another quality they do reject the superfluity (though in it self good, yet as) unprofitable for them ; from whence it proceedeth, that there is such a conformable growth in the animal, answerable as well to the bearing of Fruit, as to the extension of the branches and trunk in Trees : So is there in Trees, themselves an allicient property, to draw by roots (like lacteal veines) a juice out of the whole Earth, or cheifly the moister parts thereof ; which juice so extracted is by a natural inclination carried into the body of the stock, as into a common receptacle, out of which likewise the graft inticeth and altereth, what it finds best for the true purpose of it's being, and the end appointed it by nature,

ture, refusing the other, which yet serveth for the nourishment of the stock, as too grosse, or excrementitious, so that the juice hath need of a second and finer concoction, before it can be turned into the proper substance of the more excellent Fruit.

This is not wholly a comparison; for it will further be manifested, if we consider the growth of *Masse*, *Polypody* and *Mistletoe* on the Trees themselves, which, though all the art of man be used, cannot be perswaded to live on the meer ground: for that they have not those Ostridge-like substances to turn the grosser and (as I may say) iron juice, at the first extraction out of the Earth, into more subtile spirits for nutriment, before
that

that the Trees (like loving nurfes who, though fed with coarfe meates themfelves, give the fineft of their Chyle in their milk, to be fuck't out of their paps by the Infants) hath (as it were) chewed and digefted it for them. Whence it cometh to paffe that the *Mistle-toe* beareth fuch a Cryftalline berry, and together with the *Moffe* and *Polypody* doth abound in fuch medicinal qualitiyes, which in the Tree it felf were dogged by others more perdominant, till that by the excellent Chymiftry in thefe plants, after a due fermentation in the Tree, they are delivered.

And whereas it is urged, that Trees without grafting have and do bear Fruit ; it may be answered, that they grow a longer feafon, in
 refpect

respect of the others, before they bear, and then too, produce not so large, nor so well compacted fruit : for that their finer bodyes, which are but single, are to effect and undergo two offices at once, which they are not so able to do, as when they have a stock of a more rough (though not altogether disagreeing) nature, for to give the juice a preparation.

This likewise is the reason why such Trees are more busied in bringing forth branches and are more subject to cankers then others ; for having taken from the Earth at the first for the most part a growing nourishment, they have no other place, nor stop in it's passage, through which it might be percolated, and where it might deposite

deposite it's corrosive humor, which doth not prove so in the sower stock, where there are enemies enough to encounter and subdue it into a better temper.

CHAP. VI.

*Of stocks raised without seed, and
Trees without insition.*

NOW least it should seem strange, or a neglect in me, not to speak of a thing generally used; I will in few words deliver something concerning stocks procured out of the woods, and suckers from the roots of Trees.

Where seedlings can be obtained, I advise that none do make

H much

much use of any others, such as wild ones and suckers are, for usually their roots grow in a disproportioned manner, whereby the enriching the mould round about them cannot so truly be effected, and the grafts in few years out strip the stock in bignesse; which is a great hinderance to the bearing of good and large Fruit. The only remedy hereof is the grafting them low on the superficies of the earth.

The best sort of these are such whose bark is smooth and green, the bodyes single [*i. e.*] not two stems upon one root, and the knots thin set on them. These marks shew, that they are either descended from seed, or at the least plants of themselves, and not dependent on an old maimed trunk; a care like-
wise

wise must be had, that the roots be drawn up without any great bruising. If there be many on one root, they make unhandsome Trees ; if grey coloured, they prove hungry and hide bound ; if full of knots, (besides the other inconveniences,) they are very difficult to be grafted : and if notwithstanding this they thrive, the young sprigs through an irregular nourishing of the whole, are more subject to the canker than those of others. The roots must be cut into such a conformity as that they answer one another like the radii of the same circumference. Then set the bigger sort of them in the place, where they are to remain constantly ; and after two years they may be grafted. By this means they become

good Trees, and grow the faster and kinder, for that they are naturalised to the ground before their grafting, wherein likewise they avoid the many mischeifs that are incident to their rough Natures, upon a second removall. Yet those that are small (that is, within three inches compasse) may be set in the Nursery, and entertained like seedlings, howbeit few of them will improve so well.

What I have spoken in this is concerning the Crab, Pear, and Black-Cherry : Suckers that come from the roots of full and juicy-bark'd Plumtrees (such as the Pear-plums who) make excellent stocks, in no wise giving place to the seedlings; for the greatest part of them ascend from the

the roots of the old Tree by one single erect root at the first, out of which the side-roots immediately do spring, so that the second year after their irruption, they are like seedlings, not much regarding the assistant sap of the old Tree, as appeareth by the little improvement of the erect root beneath the side-roots, whereas above them it is of a larger compasse, receiving nourishment from them, and from it's first as from one of the same number. Crab and Pear suckers are of such a carelesse and unweaned Nature, that they will hardly adventure to send forth above two, or three new roots, as being assured that what food these will not forage for, the old stump, like a loving mother, will afford, out of her

H 3 own

own store house, as not caring much in what low estate she keeps her self, so that her offspring may flaunt it, whereby it comes to passe that they (though otherwise of hardy nature) are such punyes in their growth at the first upon a removal, when Plum-suckers (as neglecting the dependance on the old one after the first year) do, as I have said, improve themselves exceedingly ; it is good therefore to procure store of these for your Nursery, for so you gain two, or three years of the other.

Under this head of thus raising stocks the multiplying them and other plants by layers will fall ; A businesse not yet vulgarly known, though naturally practised by briers and thornes themselves ; yea of so

so great antiquity that it was found by *Alexander* the great to have been a long time used by the *Mardi* a neighbouring nation of *Hyrkania* for the artificial fortifying of their Country against (him and) their Enemies. Of this see further in *Quint. Curt. lib. 6.* where this very thing is exactly described. *Virgil* seems to give an hint hereof in this expression. *Virgil. Georg. 2.*

*Sylvarumq; alia pressos propaginis arcus
Expectant: & viva sua plantaria terra.*
Some trees require their boughs be set archwise
And make their own soile living Nurseries.

The causing Trees to increase by laying is effected after several wayes; the cheif are these. First by bare bending down a branch from a Tree into the ground, (where it is to be kept steady by a forked stick

stick drove over it and) then turning the end out of the ground upright as if it were a young one proceeding from a root of it's own, in one year that part, that is in the ground, will take root, which when you have found it to do, cut it three quarters through (hard by the roots) on the side that joins it to the Tree, then let it remain another year untouch't in the same ground, as it did at the first, this year being expired, it may at the winter be clear cut off, and transplanted. This is for very choise plants.

The second manner of laying is by cutting the branch half way or more through, and then ordering it as the former, yet a little more gently, least it break in the covering.

ing. In this the branch will root faster and stronger ; for that at the cut there is an occasion given to the sap to turn into fibres, whilst it strives to cover the wounded part. The next winter you may open the mould, wherein if you find the roots to have shot forth sufficiently you may then transplant it ; if not let it remain till another year as did the former.

Some use to take only part of the bark, three quarters round, from of the branch, and so to lay it ; but it comes all to one end, if there be any difference, the cutting is the better.

Others wreath or twist the bough in the part that is to be lay'd in the ground, which cleaveth it in Sundry places, out of which the fibres

fibres for roots will issue.

The time of laying is usually in winter, or spring, but it may be done at any time of the year, and the plant take rooting very well.

If the branch be high, so that it cannot be bended to the Earth, it then must be laid in a basket, box, or earthen pot fill'd with good mould in such wise, as shall be described when I come to speak of the vine slips, and of the Kentish codling, Nurse-garden, Sweeting, &c. who will grow without roots like ozier-sticks.

A branch sometimes will grow if two or three inches of bark be cut off round about it, as it growes on the Tree, and then clayed sufficiently about the place, where the bark was taken away. This is
done

done in *July* and *August*, and at the winter toward spring, the branch is cut off and set in the ground, where it often happeneth to thrive like another Tree. But a better way to make a bough grow on the Tree is by slicing off small peices of the bark and hacking it a little in the place where the roots should issue forth, and then placing an old boot over the bough, so that the middle of it be the container of the place that is sliced, it being thus placed must be bound close at the bottom, and filled with good Earth, afterwards in dry weather the Earth should be watered, whereby the bough will send out roots into the boot. This is to be performed in spring. If you find at latter end of *Summer* that it hath taken root,
 you

you may cut off, and set it as the former. But it often happens that instead of roots there is only certain extuberancies, or knots arisen in several places about the slicings, which are but so many preparatives for roots against the ensuing year; wherefore it must stand till the next season, at present only cut away the bark, that was reserved at the first for the better conveyance of sap into the upper part of the bough.

Now that the cion groweth, after the bark is wholly taken away, is not (as some suppose) by a passage of new sap through the clay or mould; for if it were so, the upper part would not endeavour to take root downward, that being a contrariety of motion in the same organ,

organ, which cannot be granted :
yea I scarce beleive that any juice
passeth that way for the nourishing
of the sprig ; because that all such
cions do not grow but by the medi-
ation of the roots of the Tree, who
refine the course juice of the earth,
before these receive the least atom
thereof, and although the lower
part sendeth none but good, yet
the clay and mould reduceth it into
it's former coarseness, immediately
at it's passage into the upper part
of the cion. Neither is the root-
ing caused (as others affirm) by
the arrest and stoppage of the sap
in it's descent at Autumn, where-
by it not finding a place where to
retire, doth at the cut transforme
it self into fibres ; if this were so,
and that there is any such thing as
the

the descent of the sap at the fall of the leaf, then would all Trees grow more at the root in the winter then in the Summer, the contrary whereof is sufficiently known. The true reason therefore and manner of this growing (by the leave of so many who content themselves with the former) I conceive to be by the ascent of sap through the heart and pores of the wood, which, to conserve the upper part of the cion, doth in an extending motion find out the wound, which it, (with other juice then called in a large measure to assistance) doth strive to cure by reuniting the upper to the nether part: but the wound proving too great, and that juice (by reason of the affluence of new and it's own weight) not able to return the way

way it came, nor finding any other place to divert it self, doth at the same wound burst forth into fibres, which afterward being strong (like the vessels of an Embryo when it becomes an animal subsisting of it self) act a contrary part, and suck fit nourishment for the plant, when as at the first they received it from the same. And this likewise must be the manner how all rootlesse sticks thrust into the ground do grow.

That there is a motion of sap through the internal parts and pores of the wood appears plainly to the eye, in late pruning of vines, wherein these pores manifestly shew themselves, to give the only nourishment, whose passage between the wood and bark is here really

really stop't through the thinnesse and binding driness of the bark, whereby it will sooner exhale then ascend.

If any branch (or limb) be cut off from other Trees also in the spring, there will be an exsudation (or weeping, which is the *Lachryme* in *Physick*) throughout the whole wood of the remaining part of the branch even if the bark it self should be taken away. Now that there is likewise upon occasion, a motion (though preternatural) of sap thus through the pores even downward too, I have demonstrated to my self in an experience upon a Walnut-Tree, one of the roots whereof I cut off a distance from the Tree, in the month of *March*, which within half

half an hours space began to destil
 fromward the body of the Tree, fa-
 ster then any spirit of wine can do
 in an Alembick, the bark during
 that space was hardened by the air.
 This water therefore must needs
 come by descent from the several
 parts of the Tree, and not by any
 other way ; neither could so great a
 quantity ly in the part of the root
 that remained on the Tree, for in
 three dayes space the destillation
 was so great, that if the liquor had
 been weighed, it would have ex-
 ceeded that of the root in a mani-
 fold proportion. In very young
 trees, who are of a nimbler growth,
 the substance encircling the pith is
 of a greenish colour, very tender &
 spongy, through which (I suppose)
 a larger quantity of sap doth passe,
 then doth in any other part beside.

The cheifest use of the bark is to preserve the sap from the injury of the weather, (in the like manner as the skin doth the internal parts from external injuryes,) and in no wise administring moisture to the body being it self generated by a restagnation thereof, it's office in these tricks the clay and mould do supply.

As for the sap that was drawn in the Spring & *Summer*, part thereof is converted into leaves, new branches, and Fruit; part likewise after by an exsudation through the wood turneth first into a jelly between the bark and wood, & afterward, by the help of the heat in and about *Summer* solstice, into wood it self; and the remainder is imployed in dilating the old tree; so much of it only retaineth it's own old Nature,

ture, as serveth to keep the whole moist until the next spring.

This manner of growth is manifested in that action of Woodmen, who, to know of what age any underwood is, do cut off a stick (*viz.* of Hazel or Sallow) somewhat aslope, and by telling the scaly orbes (which some men call colts I suppose they mean coats) do know the age of the wood; which orbes cannot be so distinguished, were there not every year a new one made by the hardened sap. These orbes in young sticks may be separated, but in old wood they scarce appear.

There is one thing yet remaining, which (perhaps) may cause a dissent from this my opinion, and that is an argument raised from grafting, the substance whereof is this; If there ariseth little or no sap

between the bark and the wood, how cometh it to passe, that to make the graft grow, there ought such a regard to be had to the placing of the inwardest part of the bark of the graft so exactly to the inwardest part of the bark of the stock, and not to the wood of the same, which (according to the preceding position) hath the largest quantity of sap: To this an answer may be found in the foregoing words likewise; where 'tis said, that part of the sap, after an exsudation through the wood, turneth first into a jelly between the bark and the wood: which being granted, I can say, that the sap, arriving at the outside of the wood there to generate a new orbe, doth in the restagnation seize upon and conjoine it self to that moist part of the graft, that is
of

of affinity unto it; according to the maxime, which saith, That moist things are easily contained in others bounds, but very difficultly in their own, so that by this the graft is nourished like other parts of the Tree. Now upon the cutting off the head of the stock, the woody part thereof groweth dry on the superficies of the wound; for that the sap retireth another way, because that, having no inclosure, it would pump the tree into a languishing condition, if not to death it self; which if it do escape, yet would that weeping choak the graft, wherefore it leaveth the naked face of the wood devoid of moisture: howbeit not resting unmindful of the preserving the continuity of the whole, it doth rally it's force on the borders or circumference of the wound, and assuming

for it's armour a new filme, doth under the protection thereof by a rousing March at length cover the wounded place, rendring it the same defensive cloathing, of which it had before been divested; whereby it happeneth, that the graft not being adopted, before the filme is generated, is thrust off the wood of the stock, and excluded as a stranger, to whom the stock hath no relation.

But to proceed again according to the design of the Chapter. If a branch cannot be allured to grow by laying or otherwise, nor the tree afford suckers; then may a root be cut off from the tree, and left lying in the ground; as when it was on the tree: If it dy not, it will the next spring send forth several young shoots; by reason that the sap which the root draweth, hath no way else

to

to vent it self, then by setting up new trees instead of the old one, from whence it was of late secluded. Observe that such suckers must the next autumn be cut half or three quarters through, close to the old root; and cover well above with good mould, wherein they will that next *summer* shoot out roots sufficient enough to maintain them in a removal the second winter. If you should the first year endeavour to transplant them, you would find but one single root, and that joining to the old one, as its proper and sole nurse, for want of which, or some others in the room thereof, it may chance to wither; wherefore it is better to use them in such sort as I have declared.

Some have adventured to cut down the whole tree somewhat within

within the ground , whereby every root contributeth to the making up of an Hydra-like company of young ones surrounding the stump of the old; now if the smaller sort be plucked up, and the greater let stand, these will thrive extraordinarily.

It sometimes happeneth, that before any root is cut off, or the tree felled, there doth a gallant number of upstart cions spring from the roots of the tree, whereby the tree it self pineth away through the disability of the sap, which cannot feed both young and old ; wherefore in such a case, where there is a desire of multiplying that kind, there need no doubt to be made of cutting down the tree ; For

*Quæ tenera cæso virga de trunco stetit,
Par ipsa matri tempore exiguo subit. sen.
The suckers that from felled trunckes remain,
In few yeares with the trees like bigness gain.*

These devises, though properly belonging to the Mulberry , and rare exotick plants, because of the great difficulty in propagating them, rather then to those of an Orchard, may yet for recreations sake be practised in Fruit-trees also.

